Using Weakly Trained GANs to produce 3D Models

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ABSTRACT
Generative Adversarial Networks (GAN) have become the de-facto standard for generative models. However large amounts of data are required to achieve excellent performance which makes GANs challenging to apply to sparse datasets. In order to utilize GANs with sparse datasets we propose using weakly training GANs to produce generated models which we then use to augment existing data. In this paper we utilize 2 classes of a popular 3D dataset called 3DShapeNet to train on. Next data augmentation is formed on the original models, lastly we conduct a study to assess our models on Amazon Mechanical Turk.

Author Keywords
General Adversarial Networks; 3D-Models; Data Creation; Data Augmentation

ACM Classification Keywords
H.5.m. Information Interfaces and Presentation (e.g. HCI): Miscellaneous; I.2.m. Artificial Intelligence: Miscellaneous; I.4.m. Image Processing and Computer Vision: Miscellaneous

INTRODUCTION
Theyre a multitude of application areas where generative models are promising method to solving certain problems. Generative Adversarial Networks (GAN) [2] is a particular model which is becoming the de-facto standard for generative models. However these models generally require a lot of data to generate sufficient results.

As an attempt to solve this problem we propose using the latent spaces from weakly trained GANs with sparse datasets to augment existing data. In the subsequent sections we frame our work with respect research that has been conducted with GANs, we discuss about our methodology for transforming data, produced models, and perform an evaluation of our produced models.

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RELATED WORKS
The foundation of this research is based on prior work. We use a rich 3D model repository called ShapeNet [1] which contains a multitude of semantic categories organized under WordNets taxonomy [3]. In particular we utilize the table and mug categories of ShapeNet.

Hychen talk about binvox and why voxel format is used with voxnet paper

For our model we try to learn the probabilistic latent space of tables and chairs using Wu. J, Zhang. C, Xue. T, et. als work in [4]. All of the parameters are the same however, the generator G produces 32 x 32 x 32 object, our discriminator Donly accepts models with the size of 32 x 32 x 32, the learning rate is .003.

METHODOLOGY

GENERATED RESULTS
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EVALUATION

CONCLUSION & FUTURE WORK

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